

Appl. No. 10/655,692
Amdt. dated November 26, 2007
Reply to Office Action of June 25, 2007

PATENT

Amendments to the Drawings:

The attached sheets of drawings include changes to Figs. 3 and 29. These sheets, which include Figs. 3 and 29, replace the original sheets including Figs. 3 and 29.

Attachment: Replacement Sheets

REMARKS/ARGUMENTS

This Amendment is in response to the Office Action mailed June 25, 2007.

Claims 1-14 were pending in the present application. This Amendment amends claims 1, 8, 9, 11, 13, and 14, and adds new claim 15, leaving pending in the application claims 1-15.

Reconsideration of the rejected claims is respectfully requested.

Objection to the Drawings

The drawings are objected to under 37. C.F.R. §1.83(a) as failing to show every feature of the invention specified in the claims. In particular, the Examiner asserts that claim 10 fails to meet this requirement. Applicant respectfully traverses.

Claim 10 recites a file server system “wherein [a] file control unit comprises setting means that allows a manager of the file server system to set a ratio of an amount of data transferred in a communication between said file control unit and said clients to an amount of data transferred in a communication between said file control unit and said hard disk drives,” and “wherein the amount of data transferred in the communication between said file control unit and said hard disk drives are measured to control a priority of communication processing so that a ratio that is obtained by the measured data amounts approaches the ratio that is set.” Applicant submits that at least these features are shown in the illustrative embodiment of the present invention of Fig. 15.

For example, Fig. 15 illustrates a bandwidth column 1502 that includes a user-modifiable percentage, or ratio, of bandwidth allocated to a first virtual LAN (comprising, for example, a file control unit and a plurality of clients) and a user-modifiable percentage, or ratio, of bandwidth allocated to a second virtual LAN (comprising, for example, the file control unit and plurality of hard disk drives). (Specification: pg. 39, lines 1-11). Accordingly, bandwidth column 1502 represents an illustrative embodiment of the recited “setting means” for setting “ratio of an amount of data transferred in a communication between said file control unit and said clients to an amount of data transferred in a communication between said file control unit and said hard disk drives” as recited in claim 10.

In addition, Fig. 15 illustrates a transfer amount column 1501 and a priority column 1503. Transfer amount column 1501 includes an amount of data transferred between entities of the first virtual LAN (*i.e.*, between the file control unit and the plurality of clients) and an amount of data transferred between entities of the second virtual LAN (*i.e.*, between the file control unit and the plurality of hard disk drives). Priority column 1503 includes a priority of processing for each of the virtual LANs. As described in the Specification, “the priority in the priority column 1503 is calculated by the priority controller 118 from the relation between the transfer amount column 1501 and the bandwidth column 1502. . . when Δi is large, the priority controller 118 increases the priority of the corresponding virtual network and, when Δi is small, decreases the priority of the corresponding virtual network.” (Specification: pg. 39, line 14 – pg. 40, line 2). In other words, a priority of communication processing in a given virtual LAN (*i.e.*, the priority in priority column 1503) is controlled such that the bandwidth percentage, or ratio, of transferred data measured in transfer amount column 1502 approaches the ratio set in bandwidth column 1502. Accordingly, Fig. 15 shows and example of the claimed feature: “wherein the amount of data transferred in the communication between said file control unit and said hard disk drives are measured to control a priority of communication processing so that a ratio that is obtained by the measured data amounts approaches the ratio that is set” as recited in claim 10.

In view of the foregoing, Applicant respectfully submits that the features of claim 10 are shown in Fig. 15 of the present application, and requests that the objection to the drawings be withdrawn.

Amendments to the Drawings

Figs. 3 and 29 have been amended for various informalities. In particular, Fig. 3 has been amended to change the reference numeral for the depicted “MAC address” column from “304” to “301.” Fig. 29 has been amended to add the reference numeral 2904. Applicant submits that no new matter has been introduced by virtue of these amendments.

35 U.S.C. §103(a) Rejection of Claims 1, 7, and 8

Claims 1, 7, and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis et al (U.S. Patent No. 6,343,324, hereinafter "Hubis") in view of Igari (U.S. Patent No. 6,742,094, hereinafter "Igari"). Applicant respectfully submits that Hubis and Igari, considered individually or in combination, do not teach or suggest the features of these claims.

Embodiments of the present invention are directed to techniques for ensuring data security in a network-based file server system. Fig. 1 of the Specification illustrates one embodiment of a file server system comprising a file control unit 105, a plurality of clients 101, and a plurality of hard disk drives 103. As shown, file control unit 105, clients 101, and hard disk drives 103 are interconnected via a network 100 (*e.g.*, a local area network (LAN)). Clients 101 are configured to issue read/write requests for data stored on hard disk drives 103. File control unit 105 is configured to receive and process the read/write requests issued by clients 101, thereby managing data input/output to hard disk drives 103. (Specification: pg. 11, lines 17-23).

According to one set of embodiments, file control unit 105 broadcasts a hard disk drive search message to hard disk drives 103 at each initialization of the file control unit. This hard disk drive search message is designed to discover hard disk drives that are connected to network 100. (Specification: pg. 22, lines 16-19). In response to the hard disk drive search message, hard disk drives 103 transmit ID information to file control unit 105, wherein the ID information uniquely identifies each hard disk drive. (Specification: pg. 22, line 26 – pg. 23, line 2). File control unit 105 uses this ID information to establish a setting such that hard disk drives 103 cannot directly communicate with any other device (*e.g.*, clients 101) on network 100 other than file control unit 105. (Specification: pg. 24, lines 1-23). In this manner, clients 101 are prevented from directly reading data from/writing data to hard disk drives 103, thereby improving the security of the file server system.

In accordance with the above, Applicant's independent claim 1, as amended, recites:

A file server system comprising:
a plurality of hard disk drives connected to a plurality of clients via a network;
and

a file control unit connected to the network for accepting an access request from said clients to said hard disk drives to manage the data input/output of said plurality of hard disk drives,

wherein said file control unit has configuration information with which a plurality of pieces of identification (ID) information, each identifying one of said plurality of hard disk drives, can be registered and

said file control unit broadcasts a hard disk drive search message to the plurality of hard disk drives via said network at each initialization of the file control unit,

wherein, in response to the hard disk drive search message, a hard disk drive in the plurality of hard disk drives returns ID information identifying itself to said file control unit,
and

wherein, in response to a result of comparing the returned ID information with the configuration information, said file control unit establishes a setting such that the hard disk drive cannot directly communicate with devices on said network other than said file control unit.

(Applicant's claim 1, as amended, underlining is for emphasis).

At least the above features are not taught or suggested by Hubis and/or Igari.

For example, the combination of Hubis and Igari does not teach or suggest a "file control unit" that "broadcasts a hard disk drive search message to the plurality of hard disk drives via said network at each initialization of the file control unit," wherein "in response to the hard drive search message, a hard disk drive in the plurality of hard disk drives returns ID information identifying itself to said file control unit" as recited in claim 1. In the Office Action, the Examiner concedes that these features are not taught or suggested by Hubis, but goes on to assert that these features are taught by Igari at col. 4, lines 49-53. Applicant respectfully disagrees.

Igari is directed to a technique for regulating access by a host system to hidden storage areas of a hard disk drive. (Igari: Abstract). As part of this technique, the cited section of Igari states that a host system is configured to transmit a request for drive identification information (drive ID) corresponding to a specific hard disk drive:

When the host system 2 requests to read the drive ID 160 for identifying the drive 1, the drive 1 sends the drive ID 160 stored in the flash memory 16 to the host system 2 (steps H1 and D1). The disk drive 1 uses the HDC 14 and the CPU 15 to transfer data and information to the host system 2.

(Igari: col. 4, lines 49-53; emphasis added).

Applicant submits that the cited section above does not teach anything about a file control unit that broadcasts a hard disk drive search message to a plurality of hard disk drives at each initialization of the file control unit as recited in claim 1. As best understood, the Examiner appears to construe the host system of Igari as corresponding to the file control unit of claim 1, and the drive ID request of Igari as corresponding to the hard disk drive search message of claim 1. However, as explained above, the recited file control unit is a specific device configured to accept access requests from clients and thereby manage data input/output for a plurality of hard disk drives. In contrast, the host system of Igari is merely a client computer system configured to directly access data in a storage device such as a hard disk drive. Thus, the host system of Igari cannot be fairly construed as corresponding to the file control unit of claim 1.

Further, the recited hard disk drive search message is a mechanism for discovering one or more hard disk drives that are connected a network of a file server system. In contrast, the drive ID request of Igari is simply a means for retrieving identification information for a specific hard disk drive. Thus, the drive ID request of Igari cannot be fairly construed as corresponding to the hard disk drive search message of claim 1.

Yet further, Igari is completely silent on the concept of broadcasting a hard disk drive search message at an initialization of the file control unit. For at least the above reasons, Igari fails to teach or suggest “said file control unit broadcasts a hard disk drive search message to the plurality of hard disk drives via said network at each initialization of the file control unit” as recited in claim 1. (Emphasis added).

Since Igari fails to teach anything about a file control unit or a hard disk drive search message, Igari also necessarily fails to teach or suggest “in response to the hard drive search message, a hard disk drive in the plurality of hard disk drives returns ID information identifying itself to said file control unit” as recited in claim 1.

Further, Applicant submits that Hubis and Igari, considered individually or in combination, do not teach or suggest “in response to a result of comparing the returned ID information with the configuration information, said file control unit establishes a setting such that the hard disk drive cannot directly communicate with devices on said network other than said file control unit” as recited in claim 1. In the Office Action, the Examiner asserts that this feature is shown in Fig. 1, Fig. 3, and col. 15, lines 32-40 of Hubis. Applicant respectfully disagrees.

The cited sections of Hubis describe receiving an I/O request from a host system at an array controller of a storage system. Based on the host from which the request was received, as well as the logical volume to which the request is addressed, the request is either denied or permitted. (Hubis: col. 15, lines 32-40). Thus, the cited section merely teaches the concept of performing access control at an intermediary array controller. As best understood, the host systems of Hubis always communicate indirectly with the storage volumes (e.g., hard disk drives) of the storage system through the array controller. In contrast, claim 1 specifically recites establishing a setting that determines whether clients can communicate directly with hard disk drives, or only communicate indirectly with the hard disk drives through a file control unit. Accordingly, Hubis fails to teach or suggest “in response to a result of comparing the returned ID information with the configuration information, said file control unit establishes a setting such that the hard disk drive cannot directly communicate with devices on said network other than said file control unit” as recited in claim 1. (Emphasis added).

The deficiencies of Hubis in this regard are not remedied by Igari. For example, Igari does not make any reference (and the Examiner provides no citation) to the specific concept of “in response to a result of comparing the returned ID information with the configuration information, said file control unit establishes a setting such that the hard disk drive cannot directly communicate with devices on said network other than said file control unit” as recited in claim 1.

For at least the foregoing reasons, even if Hubis and Igari were combined (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features of claim 1. Accordingly, Applicant respectfully submits

that claim 1 is allowable over Hubis and/or Igari, and request that the rejection of claim 1 be withdrawn.

Dependent claims 7 and 8 depend from independent claim 1, and are thus believed to be allowable for at least a similar rationale as discussed for claim 1, and others.

35 U.S.C. §103(a) Rejection of Claim 2

Claim 2 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari and further in view of Pherson et al (U.S. Publication No. 2002/0095602, hereinafter "Pherson"). Applicant respectfully submits that Hubis, Igari, and Pherson, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 2 depends from independent claim 1, and the rejection of claim 2 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Pherson discloses the remaining features of claim 2.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Pherson does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Pherson (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 2.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 2 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 3

Claim 3 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, Igari and Pherson and further in view of Nahum (U.S. Publication No. 2004/0078599, hereinafter "Nahum"). Applicant respectfully submits that Hubis, Igari, Pherson, and Nahum, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 3 depends from dependent claim 2, and the rejection of claim 3 is premised on the assertion that Hubis, Igari, and Pherson disclose the features recited in claim 2, and Nahum discloses the remaining features of claim 3.

As discussed above, however, Hubis, Igari, and Pherson do not disclose or suggest all of the features recited in claim 2. As best understood, Nahum does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis, Igari, and Pherson were combined with Nahum (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 3.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 3 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 4

Claim 4 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, Igari and Pherson and further in view of Daoud et al (U.S. Publication No. 2002/0087694, hereinafter "Daoud"). Applicant respectfully submits that Hubis, Igari, Pherson, and Daoud, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 4 depends from dependent claim 2, and the rejection of claim 4 is premised on the assertion that Hubis, Igari, and Pherson disclose the features recited in claim 2, and Daoud discloses the remaining features of claim 4.

As discussed above, however, Hubis, Igari, and Pherson do not disclose or suggest all of the features recited in claim 2. As best understood, Daoud does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis, Igari, and Pherson were combined with Daoud (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 4.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 4 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 5

Claim 5 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari and further in view of Pham et al (U.S. Publication No. 2003/0105830, hereinafter "Pham"). Applicant respectfully submits that Hubis, Igari, and Pham, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 5 depends from independent claim 1, and the rejection of claim 5 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Pham discloses the remaining features of claim 5.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Pham does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Pham (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 5.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 5 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 6

Claim 6 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari and further in view of Nahum. Applicant respectfully submits that Hubis, Igari, and Nahum, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 6 depends from independent claim 1, and the rejection of claim 6 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Nahum discloses the remaining features of claim 6.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Nahum does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Nahum (although there appears to be no

rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 6.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 6 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 9

Claim 9 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari and further in view of Phillips et al (U.S. Publication No. 2002/0091805, hereinafter "Phillips"). Applicant respectfully submits that Hubis, Igari, and Phillips, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 9 depends from dependent claim 8, and the rejection of claim 9 is premised on the assertion that Hubis and Igari disclose the features recited in claim 8, and Phillips discloses the remaining features of claim 9.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in claim 8. As best understood, Phillips does not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, claim 9 is believed to be allowable over the combination of Hubis, Igari, and Phillips for at least this reason.

Further, claim 9 recites additional features that are not taught or suggested by Hubis, Igari, or Phillips, considered individually or in combination. For example, claim 9 recites, in part "wherein the file control unit allows a requesting device on the network to set an ownership flag in the authentication information of any hard disk drive in the plurality of hard disk drives in which no owner has been set yet." As best understood, Hubis, Igari, and Phillips make no reference to this particular feature.

Accordingly, Applicant submits that even if Hubis and Igari were combined with Phillips (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 9.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 9 be withdrawn.

35 U.S.C. §103(a) Rejection of Claim 10

Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis and Igari and further in view of Sutherland et al (U.S. Publication No. 2002/0114341, hereinafter "Sutherland") and further in view of Blackwell et al (U.S. Publication No. 2002/0188748, hereinafter "Blackwell"). Applicant respectfully submits that Hubis, Igari, Sutherland, and Blackwell, considered individually or in combination, do not teach or suggest the features of this claim.

Claim 10 depends from independent claim 1, and the rejection of claim 10 is premised on the assertion that Hubis and Igari disclose the features recited in claim 1, and Sutherland and Blackwell disclose the remaining features of claim 10.

As discussed above, however, Hubis and Igari do not disclose or suggest all of the features recited in independent claim 1. As best understood, Sutherland and Blackwell do not provide any teaching or suggestion that would remedy these deficiencies. Accordingly, Applicant submits that even if Hubis and Igari were combined with Sutherland and Blackwell (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features recited in claim 10.

In view of the foregoing, Applicant respectfully requests that the rejection with respect to claim 10 be withdrawn.

35 U.S.C. §103(a) Rejection of Claims 11-14

Claims 11-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hubis, in view of Igari, in view of Pherson, in view of Moulton et al (U.S. Patent No. 7,062,648, hereinafter "Moulton"). Applicant respectfully submits that Hubis, Igari, Pherson, and Moulton, considered individually or in combination, do not teach or suggest the features of these claims.

Independent claim 11, as amended, recites:

A file server system comprising:
a plurality of switching hubs interconnected to form a network;
a plurality of hard disk drives connected to a plurality of clients via the network;
and
a file control unit,

each of said plurality of hard disk drives being connected to one of said plurality of switching hubs, said file control unit being connected to one of said plurality of switching hubs, said file control unit accepting an access request from said clients to said hard disk drives to manage a data input/output operation of said plurality of hard disk drives,

wherein said switching hubs perform connection control so that said file control unit and said plurality of clients belong to a first virtual network and so that said file control unit and said plurality of hard disk drives belong to a second virtual network, whereby the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual network.

(Applicant's claim 11, as amended, emphasis added).

At least the above features are not taught or suggested by Hubis, Igari, Pherson, and/or Moulton.

For example, the combination of Hubis, Igari, Pherson, and Moulton does not teach or suggest a file server system wherein “said file control unit and said plurality of clients belong to a first virtual network,” and “said file control unit and said plurality of hard disk drives belong to a second virtual network,” such that “the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual network” as recited in claim 11. In the Office Action, the Examiner concedes that Hubis and Igari make no reference to the above features, but goes on to assert that they are shown in Pherson and Moulton because “Pherson discloses hubs in a storage network ([0009]) and Moulton discloses the use of VPNs in a storage network (Col. 10, ln. 24-47).” (Office Action: pg. 12). Applicant respectfully disagrees.

Even *assuming arguendo* that Pherson discloses the general concept of “hubs in a storage network” and Moulton discloses the general concept of “VPNs in a storage network” as alleged by the Examiner, Pherson and Moulton still fail to teach the specific concepts of grouping a file control unit and a plurality of clients into a first virtual network, and grouping the file control unit and a plurality of hard disk drives into a second virtual network, whereby the clients belonging to the first virtual network cannot directly communicate with the hard disk drives belonging to the second virtual network. As described in the Specification, this network configuration obviates the need for encrypting/decrypting communications between the file control unit and the hard disk drives, thereby improving file server system performance while

maintaining data security. (Specification: pg. 7, lines 3-25). Since Pherson and Moulton fail to make any reference to this type of network configuration, they necessarily fail to teach or suggest a file server system wherein “said file control unit and said plurality of clients belong to a first virtual network,” and “said file control unit and said plurality of hard disk drives belong to a second virtual network,” such that “the plurality of clients belonging to the first virtual network cannot directly communicate with the plurality of hard disk drives belonging to the second virtual network” as recited in claim 11.

For at least the foregoing reasons, even if Hubis, Igari, Pherson, and Moulton were combined (although there appears to be no rationale for combining), the resultant combination would not teach or suggest the various features of claim 11. Accordingly, Applicant respectfully submits that claim 11 is allowable over Hubis, Igari, Pherson, and/or Moulton, and request that the rejection of claim 11 be withdrawn.

Dependent claims 12-14 depend (either directly or indirectly) from independent claim 11, and are thus believed to be allowable for at least a similar rationale as discussed for claim 11, and others.

Newly Presented Claim 15

Claim 15 have been added to cover different aspects of the present invention. This claim is supported by the Specification and does not add new matter.

Amendments to the Claims

Unless otherwise specified, amendments to the claims are made for purposes of clarity, and are not intended to alter the scope of the claims or limit any equivalents thereof. The amendments are supported by the Specification and do not add new matter.

Appl. No. 10/655,692
Amdt. dated November 26, 2007
Reply to Office Action of June 25, 2007

PATENT

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

/Andrew J. Lee/

Andrew J. Lee
Reg. No. 60,371

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300
Attachments
AJL:mg
61138916 v1